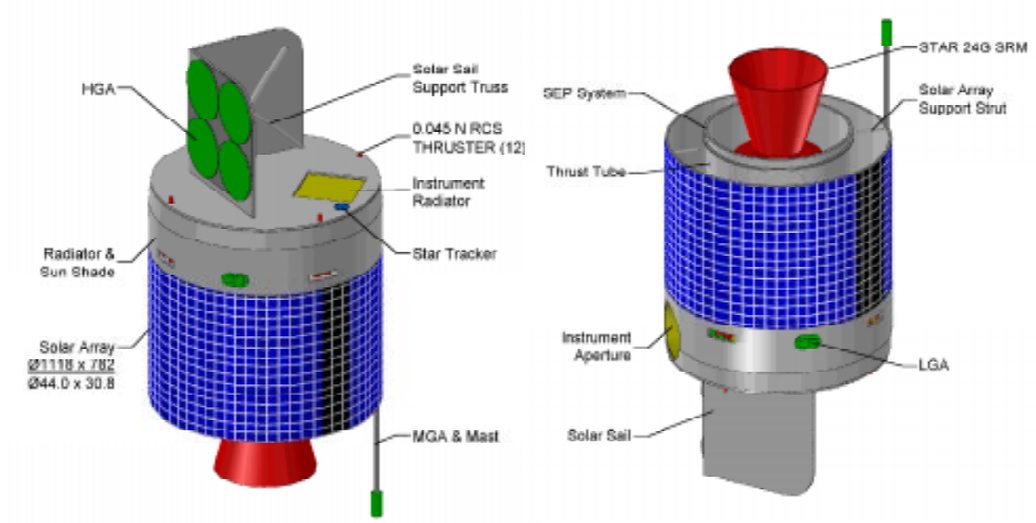

Figure 7-1 SXCI Spacecraft Configuration is designed for SXCI instrument accommodation, Pegasus XL launch, with no deployments.

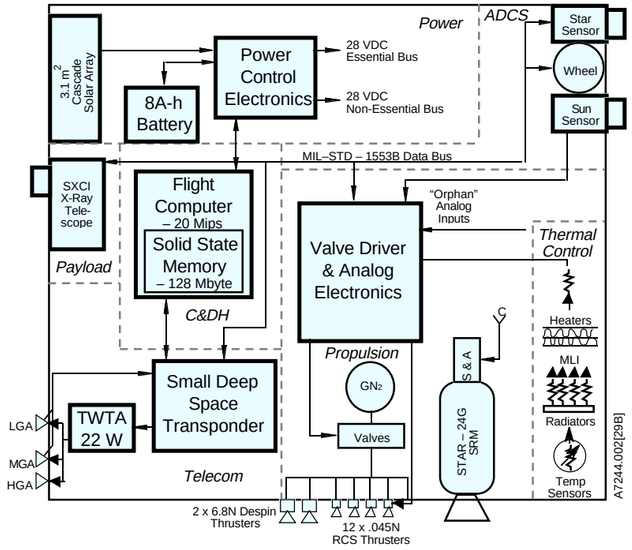

Figure 7-2 SXCI S/C Functional Architecture is modular and processor based to reduce cost and development risk.

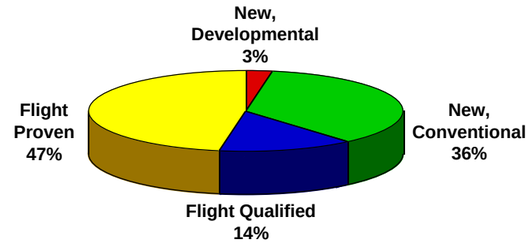

Figure 7-3 Component Heritage Summary shows extensive use of flight-qualified hardware to cut development risk.

Subsystem/Item	Estimated Mass (kg)
Structure	17.4
Mechanisms	1.7
Electrical Power & Distribution	14.0
Command, Control & Data Handling	9.0
Communications	12.8
Thermal Control	0.9
Attitude Determination & Control	6.0
Propulsion/RCS (Dry)	27.4
Subtotal, S/C Bus (Dry)	89.3
Mass Growth Contingency @ 20%	17.9
Total, SXCI S/C Bus (dry)	107.1
SXCI Payload (Total)	22.0
Total, SXCI S/C (dry)	129.1
Propellant and Pressurant	272.9
Total, SXCI S/C @ Separation	402.0
S/C to LV Adapter	10.0
Total, Stack Mass on LV	412.0
Pegasus XL Throw Weight	465.0
Margin on S/C Mass at Separation	53.0
Margin on S/C Mass at Separation (%)	13%

Figure 7-4 SXCI S/C Summary shows generous margin to reduce risk.

Subsystem/Item	Data-Take Electrical Power (W)	Downlink Electrical Power (W)
Electrical Power & Distribution	9.7	9.7
Command, Control & Data Handling	39.5	39.5
Communications	12.0	77.0
Thermal Control	34.0	0.0
Attitude Determination & Control	20.0	20.0
Propulsion	7.0	7.0
Subtotal, S/C Bus	122.2	153.2
Electrical Power Contingency @ 20%	24.4	30.6
Total, SXCI Bus	146.6	183.8
Science Payload (Total)	37.0	0.0
Total, SXCI S/C	183.6	183.8
Array Power, EOL @ 1 Au (Worst-Case)	209.1	209.1
Margin on S/C Electrical Power (W)	25.5	25.3
Margin on S/C Electrical Power EOL (%)	14%	14%
Array Efficiency, BOL	22%	
Array specific power W/m², BOL	250.0	
Array gross substrate area, m²	1.75	
Net projected substrate area, m²	0.9	
Array BOL power, sunline normal	217.5	
Array EOL power	209.1	

Figure 7-5 Electrical Power Budget shows substantial margins for primary mission modes.

Uplink data rate summary

S/C Antenna	Antenna Coverage (deg)	Antenna Gain (dBi)	Data Rate @ 0.45 Au	Margin (dB) Worst Case
LGA	Omni; 2 antennas	–6	32 bps	8.2
MGA	Az = 360 Elev = ±5	10	516 bps	12.1

Downlink data rate summary

S/C Antenna	Antenna Coverage Az/El (deg)	Gain (dBi)	Data Rate @ 0.45 Au	Margin (dB) Worst Case
LGA	Omni; 2 antennas	–6	16 bps	5.5
MGA	Az = 360 Elev = ±5	10	512 bps	6.4
HGA	3 deg cone	32	70 kbps	8.9

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1. All links X-band
2. S/C RF power = 22 W
3. DSN 34M HEF net; G/T = 53.0 dB/K; EIRP = 110 dBW
4. Downlink convolutionally encoded, r = 0.5, k = 7

Figure 7-6 Telecom Link Performance Summary shows high margins for low risk.

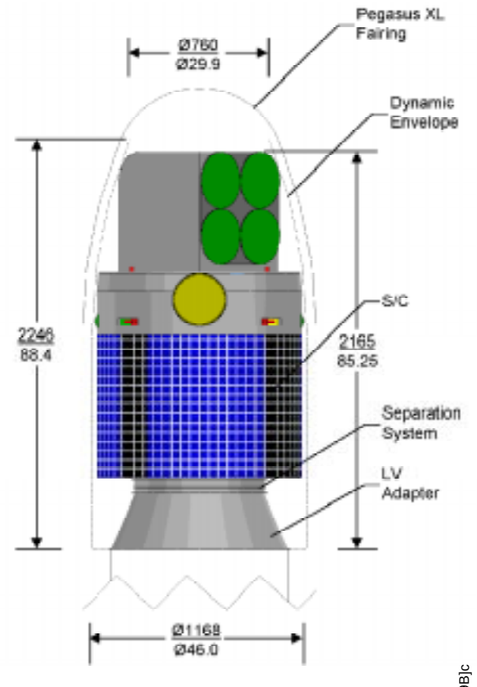

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Figure 7-7 Launch System Interface shows S/C in Pegasus XL fairing.